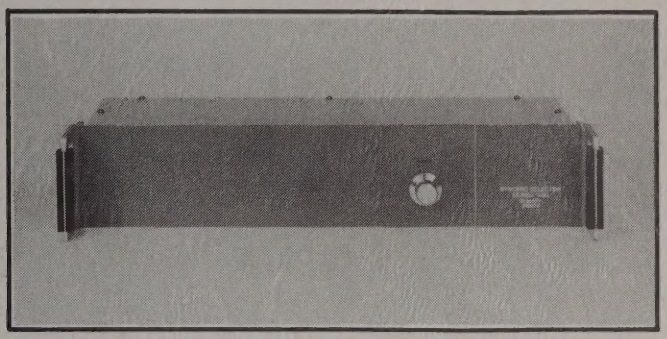
Instruction Manual

Model 1588
Synchro Selector



Scientific
Atlanta

When ordering parts from Scientific-Atlanta, Inc., be sure to include the equipment model number, equipment serial number, and a description of the part.

MODEL NO. _____

SERIAL NO. _____

MODEL 1588
SYNCHRO SELECTOR

In all correspondence concerning this publication, refer to **41R041A**

First Edition

July, 1981

SCIENTIFIC-ATLANTA, INC.

163230

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SCIENTIFIC-ATLANTA, INC.

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RECORD OF INSTRUCTION MANUAL CHANGES

The contents of 41R041A include the following changes:

Page 6-3; added cable assemblies W1 and W2
Page 7-4; add schematics for cable assemblies W1 and W2

CHAPTER 1
GENERAL INFORMATION

1.1 GENERAL

1.1.1 This instruction manual contains information for the installation, operation, and maintenance of a Scientific-Atlanta Model 1588 Synchro Selector unit. Replacement parts lists, schematic diagram, and parts location information is also included. It is recommended that before operating, making system adjustments, or proceeding into system or unit repair, the appropriate section of this manual be read carefully. Factory or customer specified modifications to the equipment (when applicable) are described in a Modification Notice contained in the rear cover envelope.

1.2 PURPOSE OF EQUIPMENT

1.2.1 The Model 1588 Synchro Selector unit is an optional accessory intended to be used with a Series 1580 Pattern Recorder. It is designed to provide a convenient means of selecting one of four axes of positioner motion. Each of the four input connections will accept either 1:1, 36:1, or dual speed synchro information from equipment such as an antenna positioner, model tower, source tower, etc.

1.3 TECHNICAL CHARACTERISTICS

1.3.1 The technical specifications of the Model 1588 Synchro Selector unit are as follows:

Table 1-1
Technical Specifications

Feature	Comments
Operation	Manual
Dimensions (Excluding Connectors)	Width: 3.5 in. (8.9 cm) Length: 19 in. (48.3 cm) Depth: 6.2 in. (15.8 cm)
Weight	Net: 5 lbs (2.3 kgs) Shipping: 15 lbs (7 kgs)
Power Requirements	None
Input Characteristics	
Number of Axis	4 (maximum)
Type	3-wire synchro, 115/90 volts, 50 to 60 Hz
Configuration	1:1/36:1 or 1:1 and 36:1
Output Characteristics	
Axis	One of four, switch selectable
Synchro	Internally selectable at 1:1 or 36:1 for each of four axis.
Configuration	Interfaces directly to the S/D Converter Interface System (Part No. 219075).
Parallel Outputs	Ancillary Indicator Units

CHAPTER 2
INSTALLATION

2.1 GENERAL

2.1.1 The Model 1588 Synchro Selector unit is normally mounted as near the Series 1580 Pattern Recorder as possible. A typical example is shown in Figure 2-1 where the Model 1588 Synchro Selector unit is mounted in a standard 17 inch high OPTIMA® cabinet together with a Model 1581 Pattern Recorder and a Model 1586 Crystal-Bolometer Amplifier. This arrangement is within interconnecting cable assembly length limits while providing a compact package of test equipment.

2.1.2 There may be circumstances where the Model 1588 Synchro Selector unit is ordered or provided as a separate unit. This arrangement should also include the 3-1/2 inch by 19 inch OPTIMA® cabinet (Scientific-Atlanta Part No. 76243) for extra protection.

2.2 INSTALLATION

2.2.1 A Model 1588 Synchro Selector unit is provided with two cable assemblies for interconnection with the Series 1580 Pattern Recorder. Figure 2-2 is a simplified interconnection block diagram illustrating suggested equipment arrangement. Other arrangements are possible and can accommodate customer requirements.

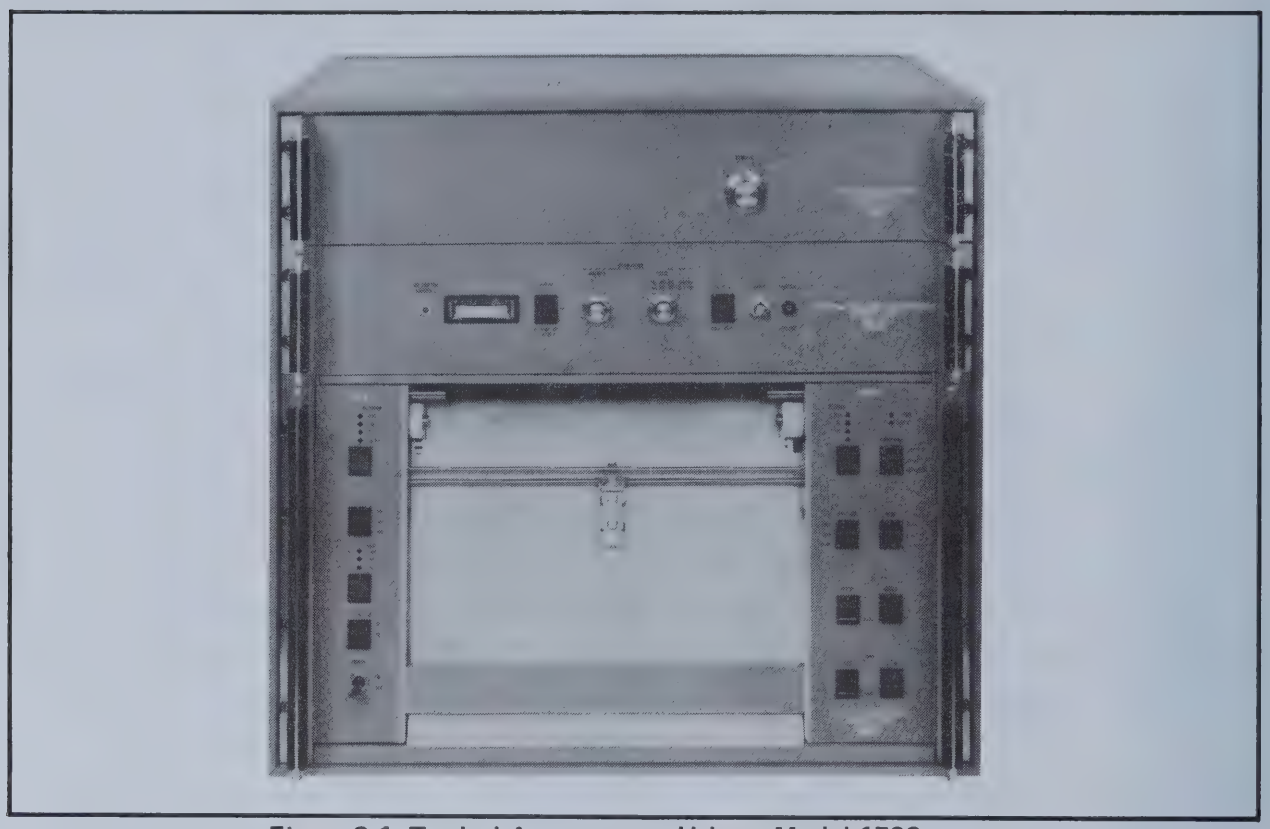

Figure 2-1. Typical Arrangement Using a Model 1588 Synchro Selector Unit and Model 1586 Crystal-Bolometer Amplifier With the Model 1581 Pattern Recorder in One Cabinet

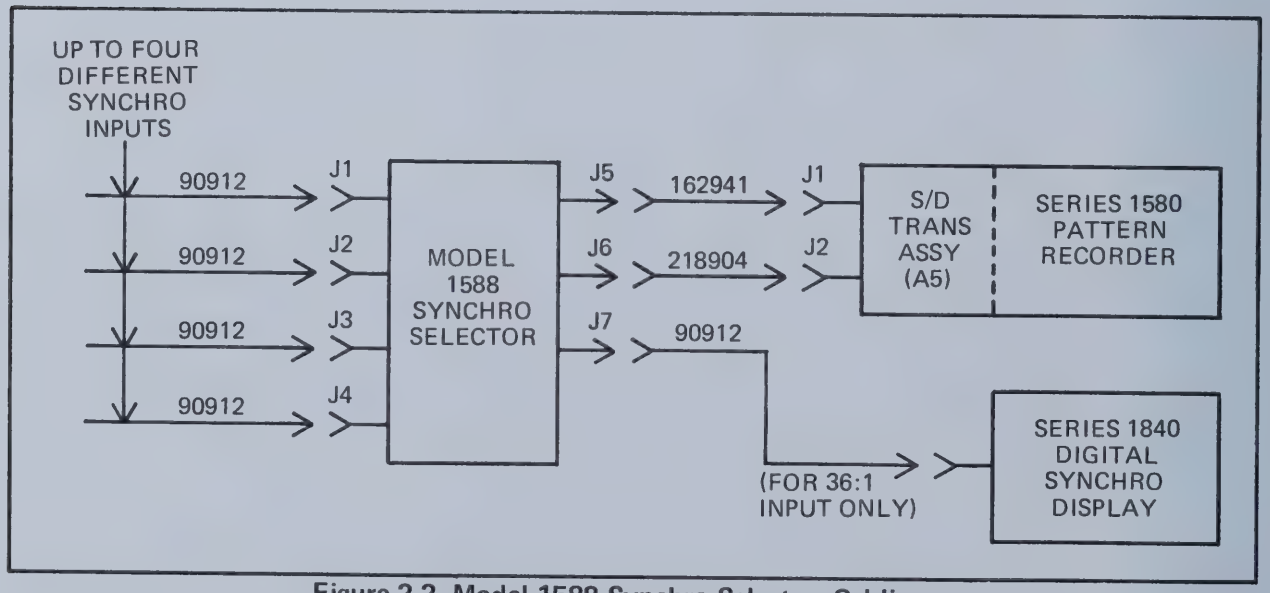

Figure 2-2. Model 1588 Synchro Selector, Cabling Requirements, Block Diagram

2.2.2 Up to four different customer provided synchro input signal sources can be connected to the Model 1588 Synchro Selector unit using rear panel connectors J1 through J4. (See Figure 2-3.) It is recommended that the signals be interconnected through a length of cable such as the Scientific-Atlanta Cable Assembly No. 90912, or equivalent, for optimum operation. If equivalent cables are used, they should provide the connections as shown in Figure 2-4.

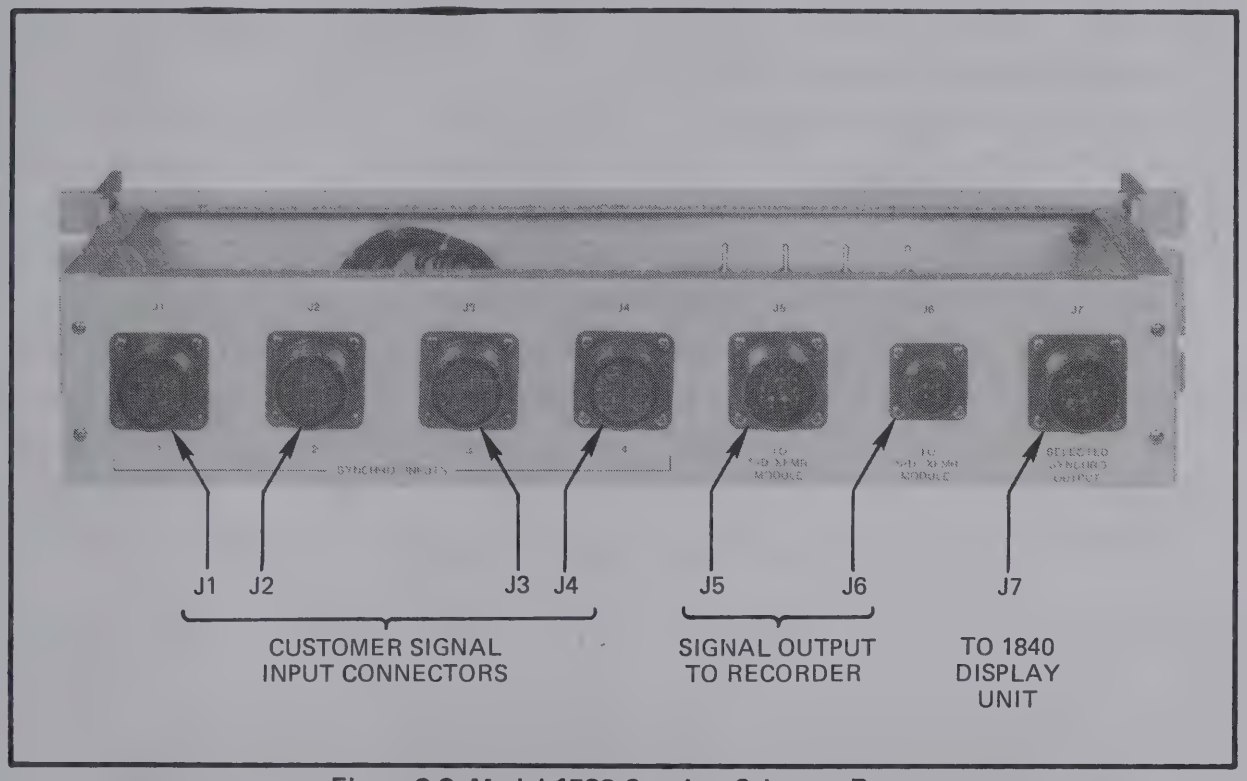

Figure 2-3. Model 1588 Synchro Selector, Rear Panel Connector Identification

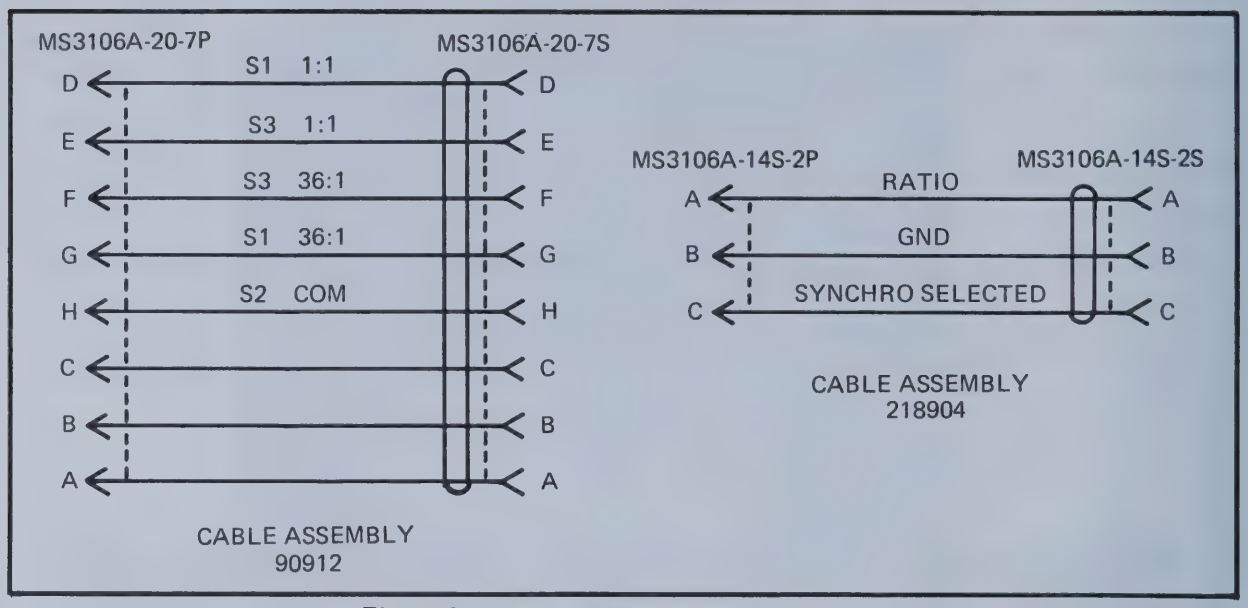

Figure 2-4. Model 1588 Synchro Selector, Cable Assembly Pin-Outs

2.2.3 Before the Model 1588 Synchro Selector unit is put into service, the top cover should be removed and the 1:1/36:1 select toggle switches (S1 through S4) positioned according to customer requirements. The 1:1/36:1 select toggle switches, S1 through S4, correspond to signal inputs through rear panel connectors J1 through J4, respectively. After the switches are positioned, replace the top cover and secure in place. Return the Model 1588 Synchro Selector unit to the original location and secure in place.

CHAPTER 3
OPERATION

3.1 GENERAL

3.1.1 The Model 1588 Synchro Selector unit provides a convenient means to select one of four axes of positioner motion to drive a Series 1580 Pattern Recorder. Operator selection is provided through the four-position front panel SYNCHRO switch. (See Figure 3-1.) The operator should know which axes are connected and can provide input signals through the rear panel connectors. The operator should also know the switch selected ratio (1:1 or 36:1) that pertain to the front panel switch positions. The Series 1580 Pattern Recorder will operate with either a 1:1 synchro input or a 36:1 synchro input, but not both simultaneously. With knowledge of the input signal sources and ratio selection, operation of the Model 1588 Synchro Selector unit is directed to the proper axis selection using the front panel SYNCHRO switch.

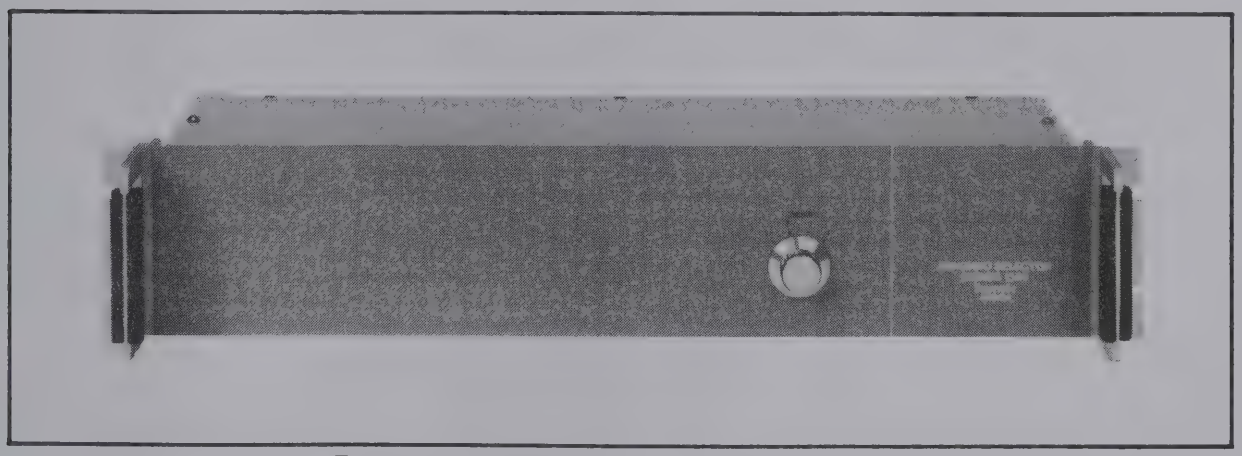

Figure 3-1. Model 1588 Synchro Selector, Front Panel Arrangement

CHAPTER 4
THEORY OF OPERATION

4.1 GENERAL

4.1.1 The Model 1588 Synchro Selector unit is a passive system component permitting the connection of up to four synchro input signals and the selection of one of these signals to be connected to the Series 1580 Pattern Recorder.

4.1.2 Each axis signal is input through a selected rear panel connector identified as J1, J2, J3, or J4. (Refer to Figures 7-1 and 7-2.) Each input connector is wired to a four-wafer four-position rotary switch (see Figure 4-1) which permits selection of which input signal is directed to the Series 1580 Pattern Recorder. A three-pole, double-throw toggle switch is connected in series with each input connector to provide the proper synchro ratio selection conditioning to the output signal.

4.1.3 The Model 1588 Synchro Selector unit circuit is arranged so that both the selected input connector and selected ratio are automatically signalled to the Series 1580 Pattern Recorder microprocessor circuits through rear panel connector J6. These signals are provided so the Series 1580 Pattern Recorder can operate automatically with a minimum of operator attention.

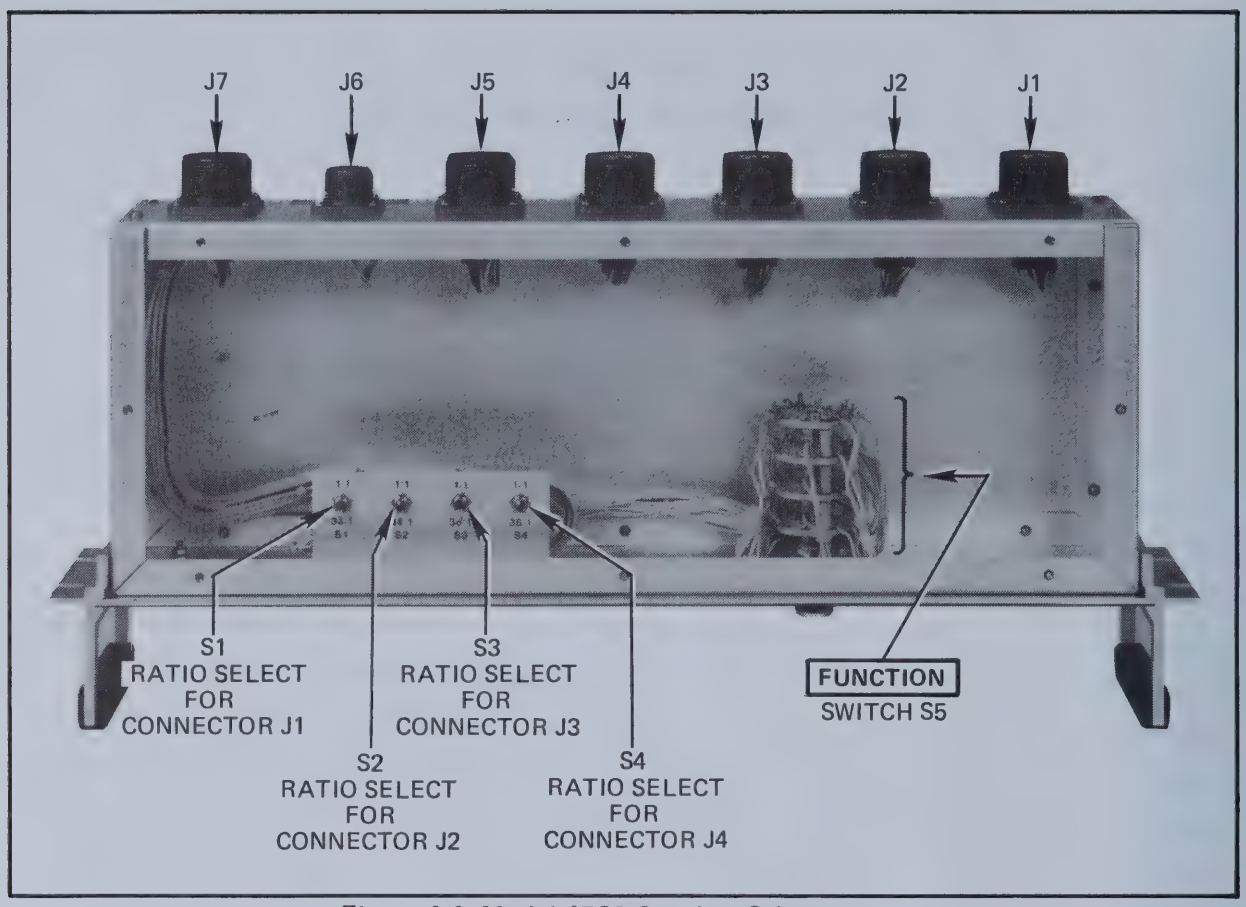

Figure 4-1. Model 1588 Synchro Selector, Top Cover Removed

CHAPTER 5
MAINTENANCE

5.1 GENERAL

5.1.1 The Model 1588 Synchro Selector unit is virtually maintenance free. Routine inspections are advised, such as checking wiring for cracked insulation and charring or discoloration indicating a previous overvoltage condition has occured. Conditions of this nature should be corrected and noted in a maintenance file, if available.

5.1.2 Normal maintenance consists of removing accumulated dust and environmental debris such as sand, cobwebs, etc., with compressed air or using a vacuum cleaner. The wafer switch contacts may be periodically cleaned and/or lubricated with a commercial aerosol solvent cleaner such as WD-40, or equivalent, or as directed by local standard operating procedures. When cleaning the painted or other metallic surfaces (i.e., front panel, etc.), use only an approved nonabrasive (window-type) solvent.

5.1.3 No regular lubrication is required for the Model 1588 Synchro Selector unit; however, if the unit is rack mounted on slides, the slide mechanism may need periodic lubrication.

5.2 REGIONAL SERVICE CENTERS

5.2.1 Regional Service Centers capable of performing periodic maintenance and providing assistance associated with the Model 1588 Synchro Selector and other Scientific-Atlanta equipment are listed below. Service assistance for areas not

listed can be provided through Scientific-Atlanta Field Service Center, 4025 Pleasantdale Road, Atlanta, Georgia 30340; TEL: 404-441-4200; TWX: 810-766-4912; TELEX: 0542898.

NORTH AMERICAN REGIONAL SERVICE CENTERS

Northeastern Regional Office
149 Middlesex Turnpike
Burlington, Massachusetts 01803
Tel: 617-272-1256

Washington D.C. Regional Office
Priest Bridge Business Park
2121 Baldwin Avenue, Suite 25A
Crofton, Maryland 21114
Tel: 301-261-3233

Southeastern Regional Office
4025 Pleasantdale Road
Atlanta, Georgia 30340
Tel: 404-449-2021

Mid Atlantic Regional Office
2100 Route 208
Fair Lawn, New Jersey 07410
Tel: 201-791-8777

Southwestern Regional Office
1237 Executive Drive, East
Richardson, Texas 75081
Tel: 214-238-1116

So. California Regional Office
P.O. Box 2668
10039 Pioneer Boulevard
Santa Fe Springs, California 90670
Tel: 213-949-9411

No. California Regional Office
3375 Scott Boulevard, Suite 304
Santa Clara, California 95051
Tel: 408-496-1040

INTERNATIONAL SERVICE CENTERS

BELGIUM
Inelco Belgium S.A.
Avenue des Croix de Guerre 94
1120 Brussels, Belgium
Tel: 02-216.01.60

BRAZIL
Arotec S.A. Industria E Commercio
Av. Pacaembu 811
01234 Sao Paulo, S.P. Brazil
Tel: 826-2266

ENGLAND
Scientific-Atlanta (U.K.), Ltd.
Horton Manor
Stanwell Road
Horton
Slough SL3 9PA, England
Tel: 011.44.2812-3211

FRANCE
Scientific-Atlanta SARL
Centre d'Affaires Paris - Nord
Batiment Ampere No. 5
93153 Le Blanc - Mesnil, France
Tel: 33.01.867-6820

GERMANY
Spectral Dynamics Electronick GmbH
Albert Schweitzerstrasse 66/3
(P.O. Box 832720)
8000 Munch 83, Germany
Tel: 49.8967.1044

ISRAEL
Racom Electronics Co., Ltd.
60 Pinkas Street
(P.O. Box 21120)
Tel Aviv 61210, Israel
Tel: 453151

ITALY
Scientific-Atlanta, S.p.A.
Via Benedetto Croce 19
00142 Rome, Italy
Tel: 39.06.542-0244

JAPAN
Toyo Corporation
Daito Building 2, 1-Chome
Hongoku-ku, Hihonbashi
Chuo-ku, Tokyo, Japan
Tel: 03-279-0771

SPAIN
Hispano Electronica S.A.
Poligono Industrial Urtinsa
(Aptdo. De Correso 48)
Alcorcon (Madrid), Spain
Tel: 619-4108

SWEDEN
Saven A.B.
Strandgaten 3
(P.O. Box 49)
18500 Waxholm, Sweden
Tel: 0764/31580

CHAPTER 6
PARTS LISTS

6.1 GENERAL

6.1.1 The parts lists for a Model 1588 Synchro Selector are included in this chapter. Special modifications, if any, are enclosed in the envelope in the rear of this manual.

6.2 EXPLANATION OF COLUMN HEADINGS

6.2.1 REF. DESIG. This identifies the assigned reference designation applicable to a system or equipment sub-unit having a separate prefix and arrangement of individual components.

6.2.2 COMP. DESIG. This identifies the components of the sub-unit in alpha-numerical order.

6.2.3 SCIENTIFIC-ATLANTA (S-A) PART NO. A five or six digit number assigned by the manufacturer to the specific part for identification and correct replacement ordering information.

6.2.4 DESCRIPTION. A brief electrical and/or mechanical description of the component.

6.2.5 FSCM. The proper Federal Supply Code for manufacturers are entered in this column. The code numbers are from the Federal Supply Code for Manufacturers Cataloging Handbooks H4-1 (Name to Code) and H4-2 (Code to Name) in effect as of the publication date of this manual. Alphabetical codes have been

arbitrarily assigned to suppliers not assigned in the H4 handbooks and these identifying codes are cross-referenced (code to name) at the end of this section.

6.2.6 MFR. PART NO. The number assigned to a part by an outside supplying manufacturer is listed in this column.

6.3 ORDERING PARTS

6.3.1 When ordering parts from Scientific-Atlanta, always include the Scientific-Atlanta part number, the part description, the unit name, the unit serial number, the subassembly name, the part manufacturer (FSCM), and the manufacturer's part number.

6.4 PARTS SUBSTITUTION

6.4.1 Common components may differ from those identified in the parts list. This difference is due to the substitution of a more current part during assembly. When this occurs, the replacement may be either a part identical to the type removed or a part meeting the description given in the parts list.

MODEL 1588 SYNCHRO SELECTOR

REF DESIG PREFIX

COMP DESIG	S-A PART NO	DESCRIPTION	FSCM	MFR PART NO
J1	70903	CONNECTR 3102A 20 7S	02660	MS3102A-20-7S
J2	70903	CONNECTR 3102A 20 7S	02660	MS3102A-20-7S
J3	70903	CONNECTR 3102A 20 7S	02660	MS3102A-20-7S
J4	70903	CONNECTR 3102A 20 7S	02660	MS3102A-20-7S
J5	70900	CONNECTR 3102A 20 7P	02660	MS3102A-20-7P
J6	70872	CONNECTR 3102A 14S 2P	02660	MS3102A-14S-2P
J7	70900	CONNECTR 3102A 20 7P	02660	MS3102A-20-7P
S1	77283	SWITCH TOG 3PDT MIN	09353	7301
S2	77283	SWITCH TOG 3PDT MIN	09353	7301
S3	77283	SWITCH TOG 3PDT MIN	09353	7301
S4	77283	SWITCH TOG 3PDT MIN	09353	7301
S5	87238	SWITCH ROT 8P 2-6 POS NSH 4 SEC		PA-2027
W1	218904	CABLE ASSY SYNCHRO SELECT CONTROL		
W2	162941	CABLE ASSY SYNCHRO		

FSCM - MANUFACTURER CROSS REFERENCE

FSCM	MANUFACTURER	CITY	STATE
02660	AMPHENOL CORP	BROADVIEW	ILL
09353	C & K COMPONENTS, INC	NEWTON	MA
10110	SCIENTIFIC-ATLANTA, INC	ATLANTA	GA

CHAPTER 7
DIAGRAMS

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ure 7-1. Model 1588 Synchro Selector, Assembly and Parts Location

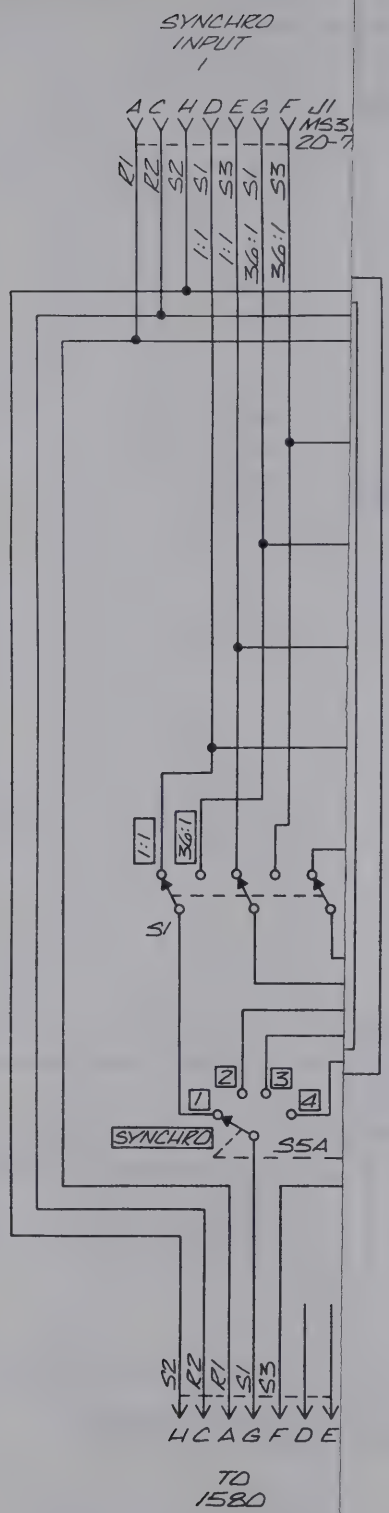


Figure 7-2. Model 1588 Synchro Selector, Schematic Diagram

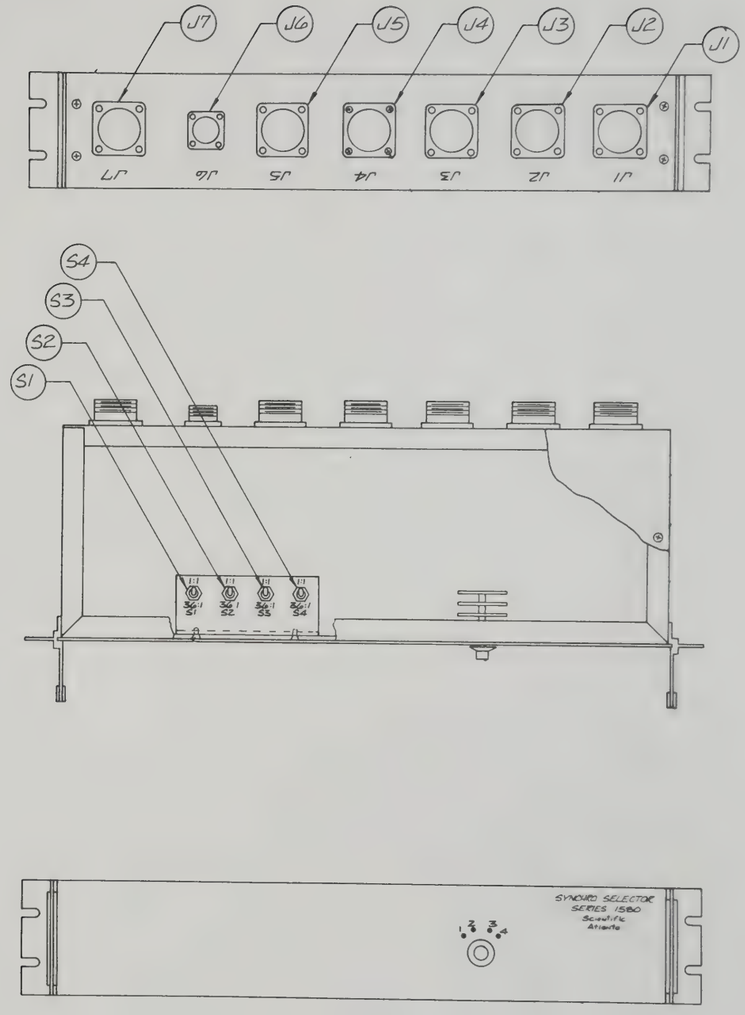


Figure 7-1. Model 1588 Synchro Selector, Assembly and Parts Location

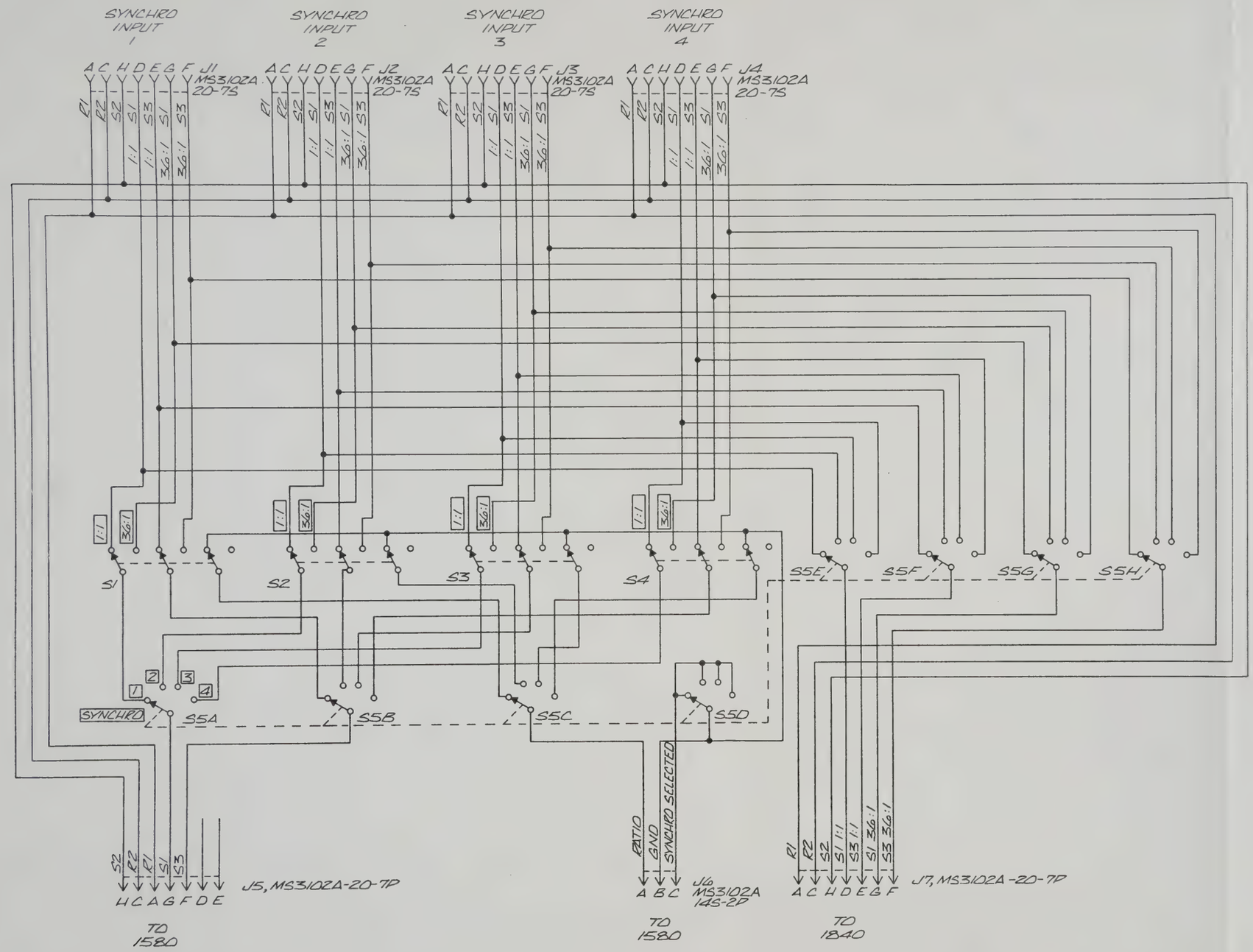
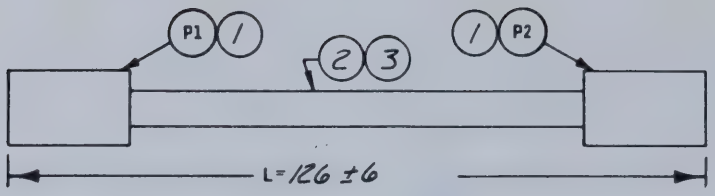
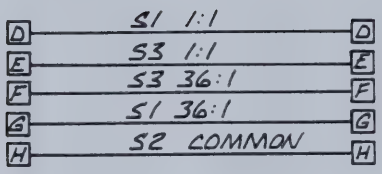

SYNCHRO INPUT 1
SYNCHRO INPUT 2
SYNCHRO INPUT 3
SYNCHRO INPUT 4
A C H D E G F J1 MS3102A 20-7S
A C H D E G F J2 MS3102A 20-7S
A C H D E G F J3 MS3102A 20-7S
A C H D E G F J4 MS3102A 20-7S
R1 R2 S2 S1 S3 S1 S3
1:1 36:1
S1 S2 S3 S4
SSE SSF SSG SSH
SYNCHRO SSA SSB SSC SSD
1 2 3 4
S2 R2 R1 S1 S3
H C A G F D E
J5, MS3102A-20-7P
TO 1580
RATIO GND SYNCHRO SELECTED
A B C J6 MS3102A 14S-2P
TO 1580
R1 R2 S2 S1 1:1 S3 1:1 S1 36:1 S3 36:1
A C H D E G F
J7, MS3102A-20-7P
TO 1840

Figure 7-2. Model 1588 Synchro Selector, Schematic Diagram





ITEM NO.	NOMENCLATURE OR DESCRIPTION	MFG OR S-A PART NO.	IDENTIFICATION
P1	Connector	70968	MS-3106A-20-7S
P2	Connector	70966	MS-3106A-20-7P
1	Clamp-Bushing	70778	
2	No. 2 Black Tubing	73207	
3	Wire, AWG No. 20	73374	

Figure 7-4. Synchro Cable Assembly (W2), 162941

CONVERSION OF VOLTAGE AND POWER RATIOS TO DECIBELS

The basic chart below indicates the number of decibels (dB) corresponding to the listed ratios of voltage or power over the range of −20 to +20 dB. For voltage or power ratios greater than those included in the chart, the ratio can be broken down into a product of two numbers, the value in dB for each found separately, and the two results added. Example: To convert a power ratio of 2,000:1 to dB, express 2,000 as 2×10^3; the number of dB corresponding to a power ratio of 2 is very nearly 3, and the number of dB for a power ratio of 10^3 is 30. Therefore, the power ratio of 2,000:1 is approximately 30 dB + 3 dB = 33 dB. In the lower righthand corner of the chart dB values for voltage and power ratios of integral powers of 10 are given.

Voltage Ratio	*Power Ratio*	*−dB+*	*Voltage Ratio*	*Power Ratio*	*Voltage Ratio*	*Power Ratio*	*−dB+*	*Voltage Ratio*	*Power Ratio*	*Voltage Ratio*	*Power Ratio*	*−dB+*	*Voltage Ratio*	*Power Ratio*
1.000	**1.000**	**0**	**1.000**	**1.000**	**.447**	**.200**	**7.0**	**2.239**	**5.012**	**.200**	**.0398**	**14.0**	**5.012**	**25.12**
.989	.977	.1	1.012	1.023	.442	.195	7.1	2.265	5.129	.197	.0389	14.1	5.070	25.70
.977	.955	.2	1.023	1.047	.437	.191	7.2	2.291	5.248	.195	.0380	14.2	5.129	26.30
.966	.933	.3	1.035	1.072	.432	.186	7.3	2.317	5.370	.193	.0372	14.3	5.188	26.92
.955	.912	.4	1.047	1.096	.427	.182	7.4	2.344	5.495	.191	.0363	14.4	5.248	27.54
.944	.891	.5	1.059	1.122	.422	.178	7.5	2.371	5.623	.188	.0355	14.5	5.309	28.18
.933	.871	.6	1.072	1.148	.417	.174	7.6	2.399	5.754	.186	.0347	14.6	5.370	28.84
.923	.851	.7	1.084	1.175	.412	.170	7.7	2.427	5.888	.184	.0339	14.7	5.433	29.51
.912	.832	.8	1.096	1.202	.407	.166	7.8	2.455	6.026	.182	.0331	14.8	5.495	30.20
.902	.813	.9	1.109	1.230	.403	.162	7.9	2.483	6.166	.180	.0324	14.9	5.559	30.90
.891	**.794**	**1.0**	**1.122**	**1.259**	**.398**	**.159**	**8.0**	**2.512**	**6.310**	**.178**	**.0316**	**15.0**	**5.623**	**31.62**
.881	.776	1.1	1.135	1.288	.394	.155	8.1	2.541	6.457	.176	.0309	15.1	5.689	32.36
.871	.759	1.2	1.148	1.318	.389	.151	8.2	2.570	6.607	.174	.0302	15.2	5.754	33.11
.861	.741	1.3	1.161	1.349	.385	.148	8.3	2.600	6.761	.172	.0295	15.3	5.821	33.88
.851	.724	1.4	1.175	1.380	.380	.145	8.4	2.630	6.918	.170	.0288	15.4	5.888	34.67
.841	.708	1.5	1.189	1.413	.376	.141	8.5	2.661	7.079	.168	.0282	15.5	5.957	35.48
.832	.692	1.6	1.202	1.445	.372	.138	8.6	2.692	7.244	.166	.0275	15.6	6.026	36.31
.822	.676	1.7	1.216	1.479	.367	.135	8.7	2.723	7.413	.164	.0269	15.7	6.095	37.15
.813	.661	1.8	1.230	1.514	.363	.132	8.8	2.754	7.586	.162	.0263	15.8	6.166	38.02
.804	.646	1.9	1.245	1.549	.359	.129	8.9	2.786	7.762	.160	.0257	15.9	6.237	38.90
.794	**.631**	**2.0**	**1.259**	**1.585**	**.355**	**.126**	**9.0**	**2.818**	**7.943**	**.159**	**.0251**	**16.0**	**6.310**	**39.81**
.785	.617	2.1	1.274	1.622	.351	.123	9.1	2.851	8.128	.157	.0246	16.1	6.383	40.74
.776	.603	2.2	1.288	1.660	.347	.120	9.2	2.884	8.318	.155	.0240	16.2	6.457	41.69
.767	.589	2.3	1.303	1.698	.343	.118	9.3	2.917	8.511	.153	.0234	16.3	6.531	42.66
.759	.575	2.4	1.318	1.738	.339	.115	9.4	2.951	8.710	.151	.0229	16.4	6.607	43.65
.750	.562	2.5	1.334	1.778	.335	.112	9.5	2.985	8.913	.150	.0224	16.5	6.683	44.67
.741	.550	2.6	1.349	1.820	.331	.110	9.6	3.020	9.120	.148	.0219	16.6	6.761	45.71
.733	.537	2.7	1.365	1.862	.327	.107	9.7	3.055	9.333	.146	.0214	16.7	6.839	46.77
.724	.525	2.8	1.380	1.905	.324	.105	9.8	3.090	9.550	.145	.0209	16.8	6.918	47.86
.716	.513	2.9	1.396	1.950	.320	.102	9.9	3.126	9.772	.143	.0204	16.9	6.998	48.98
.708	**.501**	**3.0**	**1.413**	**1.995**	**.316**	**.100**	**10.0**	**3.162**	**10.000**	**.141**	**.0200**	**17.0**	**7.079**	**50.12**
.700	.490	3.1	1.429	2.042	.313	.0977	10.1	3.199	10.23	.140	.0195	17.1	7.161	51.29
.692	.479	3.2	1.445	2.089	.309	.0955	10.2	3.236	10.47	.138	.0191	17.2	7.244	52.48
.684	.468	3.3	1.462	2.138	.306	.0933	10.3	3.273	10.72	.137	.0186	17.3	7.328	53.70
.676	.457	3.4	1.479	2.188	.302	.0912	10.4	3.311	10.96	.135	.0182	17.4	7.413	54.95
.668	.447	3.5	1.496	2.239	.299	.0891	10.5	3.350	11.22	.133	.0178	17.5	7.499	56.23
.661	.437	3.6	1.514	2.291	.295	.0871	10.6	3.388	11.48	.132	.0174	17.6	7.586	57.54
.653	.427	3.7	1.531	2.344	.292	.0851	10.7	3.428	11.75	.130	.0170	17.7	7.674	58.88
.646	.417	3.8	1.549	2.399	.288	.0832	10.8	3.467	12.02	.129	.0166	17.8	7.762	60.26
.638	.407	3.9	1.567	2.455	.285	.0813	10.9	3.508	12.30	.127	.0162	17.9	7.852	61.66
.631	**.398**	**4.0**	**1.585**	**2.512**	**.282**	**.0794**	**11.0**	**3.548**	**12.59**	**.126**	**.0159**	**18.0**	**7.943**	**63.10**
.624	.389	4.1	1.603	2.570	.279	.0776	11.1	3.589	12.88	.125	.0155	18.1	8.035	64.57
.617	.380	4.2	1.622	2.630	.275	.0759	11.2	3.631	13.18	.123	.0151	18.2	8.128	66.07
.610	.372	4.3	1.641	2.692	.272	.0741	11.3	3.673	13.49	.122	.0148	18.3	8.222	67.61
.603	.363	4.4	1.660	2.754	.269	.0724	11.4	3.715	13.80	.120	.0145	18.4	8.318	69.18
.596	.355	4.5	1.679	2.818	.266	.0708	11.5	3.758	14.13	.119	.0141	18.5	8.414	70.79
.589	.347	4.6	1.698	2.884	.263	.0692	11.6	3.802	14.45	.118	.0138	18.6	8.511	72.44
.582	.339	4.7	1.718	2.951	.260	.0676	11.7	3.846	14.79	.116	.0135	18.7	8.610	74.13
.575	.331	4.8	1.738	3.020	.257	.0661	11.8	3.890	15.14	.115	.0132	18.8	8.710	75.86
.569	.324	4.9	1.758	3.090	.254	.0646	11.9	3.936	15.49	.114	.0129	18.9	8.811	77.62
.562	**.316**	**5.0**	**1.778**	**3.162**	**.251**	**.0631**	**12.0**	**3.981**	**15.85**	**.112**	**.0126**	**19.0**	**8.913**	**79.43**
.556	.309	5.1	1.799	3.236	.248	.0617	12.1	4.027	16.22	.111	.0123	19.1	9.016	81.28
.550	.302	5.2	1.820	3.311	.246	.0603	12.2	4.074	16.60	.110	.0120	19.2	9.120	83.18
.543	.295	5.3	1.841	3.388	.243	.0589	12.3	4.121	16.98	.108	.0118	19.3	9.226	85.11
.537	.288	5.4	1.862	3.467	.240	.0575	12.4	4.169	17.38	.107	.0115	19.4	9.333	87.10
.531	.282	5.5	1.884	3.548	.237	.0562	12.5	4.217	17.78	.106	.0112	19.5	9.441	89.13
.525	.275	5.6	1.905	3.631	.234	.0550	12.6	4.266	18.20	.105	.0110	19.6	9.550	91.20
.519	.269	5.7	1.928	3.715	.232	.0537	12.7	4.315	18.62	.104	.0107	19.7	9.661	93.33
.513	.263	5.8	1.950	3.802	.229	.0525	12.8	4.365	19.05	.102	.0105	19.8	9.772	95.50
.507	.257	5.9	1.972	3.890	.227	.0513	12.9	4.416	19.50	.101	.0102	19.9	9.886	97.72
.501	**.251**	**6.0**	**1.995**	**3.981**	**.224**	**.0501**	**13.0**	**4.467**	**19.95**	**.100**	**.0100**	**20.0**	**10.000**	**100.00**
.496	.246	6.1	2.018	4.074	.221	.0490	13.1	4.519	20.42		10^{-3}	30		10^3
.490	.240	6.2	2.042	4.169	.219	.0479	13.2	4.571	20.89	10^{-2}	10^{-4}	40	10^2	10^4
.484	.234	6.3	2.065	4.266	.216	.0468	13.3	4.624	21.38					
.479	.229	6.4	2.089	4.365	.214	.0457	13.4	4.677	21.88		10^{-5}	50		10^5
.473	.224	6.5	2.113	4.467	.211	.0447	13.5	4.732	22.39	10^{-3}	10^{-6}	60	10^3	10^6
.468	.219	6.6	2.138	4.571	.209	.0437	13.6	4.786	22.91		10^{-7}	70		10^7
.462	.214	6.7	2.163	4.677	.207	.0427	13.7	4.842	23.44	10^{-4}	10^{-8}	80	10^4	10^8
.457	.209	6.8	2.188	4.786	.204	.0417	13.8	4.898	23.99		10^{-9}	90		10^9
.452	.204	6.9	2.213	4.898	.202	.0407	13.9	4.955	24.55					
										10^{-5}	10^{-10}	100	10^5	10^{10}
											10^{-11}	110		10^{11}
										10^{-6}	10^{-12}	120	10^6	10^{12}

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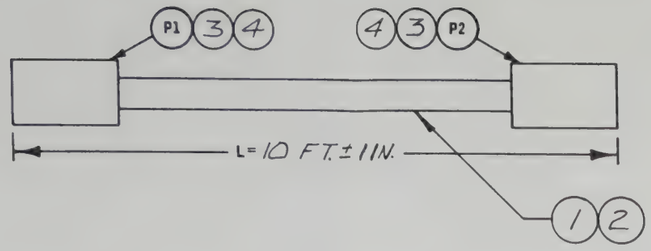
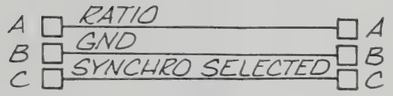
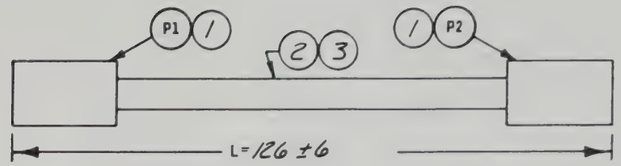
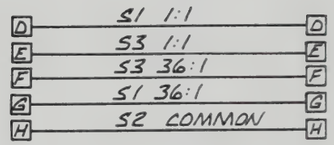




ITEM NO.	NOMENCLATURE OR DESCRIPTION	MFG OR S-A PART NO.	IDENTIFICATION
P1	Connector	70944	MS3106A-14S-2S
P2	Connector	70943	MS3106A-14S-2P
1	Wire, Insulated	73374	20 AWG, Stranded
2	Tubing, Black	75932	PVC-105 x 3/8
3	Clamp, Cable	70775	
4	Bushing	78103	

Figure 7-3. Synchro Selector Control Cable Assembly (W1), 218904





ITEM NO.	NOMENCLATURE OR DESCRIPTION	MFG OR S-A PART NO.	IDENTIFICATION
P1	Connector	70968	MS-3106A-20-7S
P2	Connector	70966	MS-3106A-20-7P
1	Clamp-Bushing	70778	
2	No. 2 Black Tubing	73207	
3	Wire, AWG No. 20	73374	

Figure 7-4. Synchro Cable Assembly (W2), 162941

CONVERSION OF VOLTAGE AND POWER RATIOS TO DECIBELS

The basic chart below indicates the number of decibels (dB) corresponding to the listed ratios of voltage or power over the range of −20 to +20 dB. For voltage or power ratios greater than those included in the chart, the ratio can be broken down into a product of two numbers, the value in dB for each found separately, and the two results added. Example: To convert a power ratio of 2,000:1 to dB, express 2,000 as 2×10^3; the number of dB corresponding to a power ratio of 2 is very nearly 3, and the number of dB for a power ratio of 10^3 is 30. Therefore, the power ratio of 2,000:1 is approximately 30 dB + 3 dB = 33 dB. In the lower righthand corner of the chart dB values for voltage and power ratios of integral powers of 10 are given.

Voltage Ratio	*Power Ratio*	*−dB+*	*Voltage Ratio*	*Power Ratio*	*Voltage Ratio*	*Power Ratio*	*−dB+*	*Voltage Ratio*	*Power Ratio*	*Voltage Ratio*	*Power Ratio*	*−dB+*	*Voltage Ratio*	*Power Ratio*
1.000	**1.000**	**0**	**1.000**	**1.000**	**.447**	**.200**	**7.0**	**2.239**	**5.012**	**.200**	**.0398**	**14.0**	**5.012**	**25.12**
.989	.977	.1	1.012	1.023	.442	.195	7.1	2.265	5.129	.197	.0389	14.1	5.070	25.70
.977	.955	.2	1.023	1.047	.437	.191	7.2	2.291	5.248	.195	.0380	14.2	5.129	26.30
.966	.933	.3	1.035	1.072	.432	.186	7.3	2.317	5.370	.193	.0372	14.3	5.188	26.92
.955	.912	.4	1.047	1.096	.427	.182	7.4	2.344	5.495	.191	.0363	14.4	5.248	27.54
.944	.891	.5	1.059	1.122	.422	.178	7.5	2.371	5.623	.188	.0355	14.5	5.309	28.18
.933	.871	.6	1.072	1.148	.417	.174	7.6	2.399	5.754	.186	.0347	14.6	5.370	28.84
.923	.851	.7	1.084	1.175	.412	.170	7.7	2.427	5.888	.184	.0339	14.7	5.433	29.51
.912	.832	.8	1.096	1.202	.407	.166	7.8	2.455	6.026	.182	.0331	14.8	5.495	30.20
.902	.813	.9	1.109	1.230	.403	.162	7.9	2.483	6.166	.180	.0324	14.9	5.559	30.90
.891	**.794**	**1.0**	**1.122**	**1.259**	**.398**	**.159**	**8.0**	**2.512**	**6.310**	**.178**	**.0316**	**15.0**	**5.623**	**31.62**
.881	.776	1.1	1.135	1.288	.394	.155	8.1	2.541	6.457	.176	.0309	15.1	5.689	32.36
.871	.759	1.2	1.148	1.318	.389	.151	8.2	2.570	6.607	.174	.0302	15.2	5.754	33.11
.861	.741	1.3	1.161	1.349	.385	.148	8.3	2.600	6.761	.172	.0295	15.3	5.821	33.88
.851	.724	1.4	1.175	1.380	.380	.145	8.4	2.630	6.918	.170	.0288	15.4	5.888	34.67
.841	.708	1.5	1.189	1.413	.376	.141	8.5	2.661	7.079	.168	.0282	15.5	5.957	35.48
.832	.692	1.6	1.202	1.445	.372	.138	8.6	2.692	7.244	.166	.0275	15.6	6.026	36.31
.822	.676	1.7	1.216	1.479	.367	.135	8.7	2.723	7.413	.164	.0269	15.7	6.095	37.15
.813	.661	1.8	1.230	1.514	.363	.132	8.8	2.754	7.586	.162	.0263	15.8	6.166	38.02
.804	.646	1.9	1.245	1.549	.359	.129	8.9	2.786	7.762	.160	.0257	15.9	6.237	38.90
.794	**.631**	**2.0**	**1.259**	**1.585**	**.355**	**.126**	**9.0**	**2.818**	**7.943**	**.159**	**.0251**	**16.0**	**6.310**	**39.81**
.785	.617	2.1	1.274	1.622	.351	.123	9.1	2.851	8.128	.157	.0246	16.1	6.383	40.74
.776	.603	2.2	1.288	1.660	.347	.120	9.2	2.884	8.318	.155	.0240	16.2	6.457	41.69
.767	.589	2.3	1.303	1.698	.343	.118	9.3	2.917	8.511	.153	.0234	16.3	6.531	42.66
.759	.575	2.4	1.318	1.738	.339	.115	9.4	2.951	8.710	.151	.0229	16.4	6.607	43.65
.750	.562	2.5	1.334	1.778	.335	.112	9.5	2.985	8.913	.150	.0224	16.5	6.683	44.67
.741	.550	2.6	1.349	1.820	.331	.110	9.6	3.020	9.120	.148	.0219	16.6	6.761	45.71
.733	.537	2.7	1.365	1.862	.327	.107	9.7	3.055	9.333	.146	.0214	16.7	6.839	46.77
.724	.525	2.8	1.380	1.905	.324	.105	9.8	3.090	9.550	.145	.0209	16.8	6.918	47.86
.716	.513	2.9	1.396	1.950	.320	.102	9.9	3.126	9.772	.143	.0204	16.9	6.998	48.98
.708	**.501**	**3.0**	**1.413**	**1.995**	**.316**	**.100**	**10.0**	**3.162**	**10.000**	**.141**	**.0200**	**17.0**	**7.079**	**50.12**
.700	.490	3.1	1.429	2.042	.313	.0977	10.1	3.199	10.23	.140	.0195	17.1	7.161	51.29
.692	.479	3.2	1.445	2.089	.309	.0955	10.2	3.236	10.47	.138	.0191	17.2	7.244	52.48
.684	.468	3.3	1.462	2.138	.306	.0933	10.3	3.273	10.72	.137	.0186	17.3	7.328	53.70
.676	.457	3.4	1.479	2.188	.302	.0912	10.4	3.311	10.96	.135	.0182	17.4	7.413	54.95
.668	.447	3.5	1.496	2.239	.299	.0891	10.5	3.350	11.22	.133	.0178	17.5	7.499	56.23
.661	.437	3.6	1.514	2.291	.295	.0871	10.6	3.388	11.48	.132	.0174	17.6	7.586	57.54
.653	.427	3.7	1.531	2.344	.292	.0851	10.7	3.428	11.75	.130	.0170	17.7	7.674	58.88
.646	.417	3.8	1.549	2.399	.288	.0832	10.8	3.467	12.02	.129	.0166	17.8	7.762	60.26
.638	.407	3.9	1.567	2.455	.285	.0813	10.9	3.508	12.30	.127	.0162	17.9	7.852	61.66
.631	**.398**	**4.0**	**1.585**	**2.512**	**.282**	**.0794**	**11.0**	**3.548**	**12.59**	**.126**	**.0159**	**18.0**	**7.943**	**63.10**
.624	.389	4.1	1.603	2.570	.279	.0776	11.1	3.589	12.88	.125	.0155	18.1	8.035	64.57
.617	.380	4.2	1.622	2.630	.275	.0759	11.2	3.631	13.18	.123	.0151	18.2	8.128	66.07
.610	.372	4.3	1.641	2.692	.272	.0741	11.3	3.673	13.49	.122	.0148	18.3	8.222	67.61
.603	.363	4.4	1.660	2.754	.269	.0724	11.4	3.715	13.80	.120	.0145	18.4	8.318	69.18
.596	.355	4.5	1.679	2.818	.266	.0708	11.5	3.758	14.13	.119	.0141	18.5	8.414	70.79
.589	.347	4.6	1.698	2.884	.263	.0692	11.6	3.802	14.45	.118	.0138	18.6	8.511	72.44
.582	.339	4.7	1.718	2.951	.260	.0676	11.7	3.846	14.79	.116	.0135	18.7	8.610	74.13
.575	.331	4.8	1.738	3.020	.257	.0661	11.8	3.890	15.14	.115	.0132	18.8	8.710	75.86
.569	.324	4.9	1.758	3.090	.254	.0646	11.9	3.936	15.49	.114	.0129	18.9	8.811	77.62
.562	**.316**	**5.0**	**1.778**	**3.162**	**.251**	**.0631**	**12.0**	**3.981**	**15.85**	**.112**	**.0126**	**19.0**	**8.913**	**79.43**
.556	.309	5.1	1.799	3.236	.248	.0617	12.1	4.027	16.22	.111	.0123	19.1	9.016	81.28
.550	.302	5.2	1.820	3.311	.246	.0603	12.2	4.074	16.60	.110	.0120	19.2	9.120	83.18
.543	.295	5.3	1.841	3.388	.243	.0589	12.3	4.121	16.98	.108	.0118	19.3	9.226	85.11
.537	.288	5.4	1.862	3.467	.240	.0575	12.4	4.169	17.38	.107	.0115	19.4	9.333	87.10
.531	.282	5.5	1.884	3.548	.237	.0562	12.5	4.217	17.78	.106	.0112	19.5	9.441	89.13
.525	.275	5.6	1.905	3.631	.234	.0550	12.6	4.266	18.20	.105	.0110	19.6	9.550	91.20
.519	.269	5.7	1.928	3.715	.232	.0537	12.7	4.315	18.62	.104	.0107	19.7	9.661	93.33
.513	.263	5.8	1.950	3.802	.229	.0525	12.8	4.365	19.05	.102	.0105	19.8	9.772	95.50
.507	.257	5.9	1.972	3.890	.227	.0513	12.9	4.416	19.50	.101	.0102	19.9	9.886	97.72
.501	**.251**	**6.0**	**1.995**	**3.981**	**.224**	**.0501**	**13.0**	**4.467**	**19.95**	**.100**	**.0100**	**20.0**	**10.000**	**100.00**
.496	.246	6.1	2.018	4.074	.221	.0490	13.1	4.519	20.42					
.490	.240	6.2	2.042	4.169	.219	.0479	13.2	4.571	20.89		10^{-3}	30		10^3
.484	.234	6.3	2.065	4.266	.216	.0468	13.3	4.624	21.38	10^{-2}	10^{-4}	40	10^2	10^4
.479	.229	6.4	2.089	4.365	.214	.0457	13.4	4.677	21.88					
											10^{-5}	50		10^5
.473	.224	6.5	2.113	4.467	.211	.0447	13.5	4.732	22.39	10^{-3}	10^{-6}	60	10^3	10^6
.468	.219	6.6	2.138	4.571	.209	.0437	13.6	4.786	22.91		10^{-7}	70		10^7
.462	.214	6.7	2.163	4.677	.207	.0427	13.7	4.842	23.44	10^{-4}	10^{-8}	80	10^4	10^8
.457	.209	6.8	2.188	4.786	.204	.0417	13.8	4.898	23.99		10^{-9}	90		10^9
.452	.204	6.9	2.213	4.898	.202	.0407	13.9	4.955	24.55					
										10^{-5}	10^{-10}	100	10^5	10^{10}
											10^{-11}	110		10^{11}
										10^{-6}	10^{-12}	120	10^6	10^{12}

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